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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

06-ESD-0021

DEC 14 2005

Mr. R. G. Gallagher, President
and Chief Executive Officer
Fluor Hanford, Inc.
Richland, Washington 99352

Dear Mr. Gallagher:

CONTRACT NO. DE-AC06-96RL13200 – LETTER OF DIRECTION TO RESPOND TO SITEWIDE ACTIONS IN NOTICE OF VIOLATION AND COMPLIANCE ORDER ON EMISSION UNIT 296-S-21 LOCATED AT THE 222-S LABORATORY

The purpose of this letter is to authorize FHI to proceed with a response to the sitewide actions contained in the enclosed Notice of Violation and Compliance Order (NOV). The NOV is from Allen W. Conklin, State of Washington Department of Health (WDOH), to Keith A. Klein, RL, and Roy J. Schepens, ORP, "Notice of Violation and Compliance Order," AIR 05-1103, dated November 17, 2005.

Please work jointly with CH_2MHill, Battelle Memorial Institute, Bechtel National, Inc., and Washington Closure Hanford, LLC, to develop a technical basis and coordinate with other site contractors for their input. RL would also like to work with you to meet with WDOH to gain their agreement on the response. Please provide a regulatory-acceptable response to the NOV that is as cost effective and as schedule cognizant as feasible. Your scope of work is limited to the sitewide actions described in Section II Order 3, Page 6 of the NOV. Please provide the appropriate documents to RL for transmission to WDOH 30 days prior to the regulatory due date.

The Government considers this action to be within the scope of the existing contract and therefore, the action does not involve or authorize any delay in delivery or additional cost to the Government, either direct or indirect.

If you have questions, please contact me, or your staff may contact Doug S. Shoop, Assistant Manager for Safety and Engineering, on 376-0108.

Sincerely,

Keith A. Klein
Manager

ESD:MFJ

Enclosure

cc: see Page 2

AIR 05-1103

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
OFFICE OF RADIATION PROTECTION
111 Israel Road SE • PO Box 47827 • Olympia, Washington 98504-7827
TDD Relay Service: 1-800-833-6388

November 17, 2005

Mr. Keith A. Klein, Manager
U. S. Department of Energy
Richland Operations Office
P. O. Box 550 MSIN A 7-50
Richland, Washington 99352

Mr. Roy J. Schepens, Manager
U. S. Department of Energy
Office of River Protection
P. O. Box 450 MSIN H 6-60
Richland, Washington 99352

Addressees:

NOTICE OF VIOLATION AND COMPLIANCE ORDER

This Notice of Violation and Compliance Order is issued to the United States Department of Energy under RCW 70.94.422(1), 70.94.332, and WAC 246-247-100.

I. FINDINGS

1. The United States Department of Energy owns and operates about 116 actively ventilated emission units licensed by the Washington State Department of Health (DOH) at the Hanford Site located near Richland, Washington, including 84 "minor" emission units and 32 "major" emission units. These emission units emit or have the potential-to-emit radionuclides to the air and are regulated by DOH under chapter 246-247 WAC and 40 CFR Part 61, subpart H. Among the Department of Energy's actively ventilated emission units is the 296-S-21 emission unit located at the 222-S Laboratory. The Department of Energy Richland Operations operated the unit until October 1, 2003. The Office of River Protection took over operation of the unit on October 1, 2003 and currently operates the unit.

2. **Violation: The Department of Energy has incorrectly designated the 296-S-21 emission unit at the 222-S Laboratory as a "minor" emission unit based on a miscalculation of the emission unit's potential-to-emit.**

3. Radionuclide air emissions and effective dose equivalent values to the maximally exposed individual (MEI) must be measured and calculated in order to determine compliance with radionuclide air emission standards pursuant to chapter 246-247 WAC. To determine the frequency with which emissions must be measured, the emission unit's potential-to-emit (PTE) must be determined. All emission units that have a potential-to-emit radionuclides into the air in quantities that could cause an effective dose equivalent to the MEI in excess of 1% of the standard are commonly referred to as "major" stacks and require continuous monitoring. Emission units that have a lower potential to discharge are commonly referred to as "minor" stacks and do not require continuous monitoring. The Department of Energy has designated the 296-S-21 emission unit at the 222-S Laboratory as a minor stack that does not require continuous monitoring and DOH has relied on this designation for Notice of Construction approvals. However, the Department of Health's recent audit of the 296-S-21 emission unit has identified the unit as a major stack that requires continuous monitoring.

4. The emission standards against which an emission unit's PTE must be measured are identified in WAC 246-247-040, which requires that the enforce the most stringent standard in place including those contained in 40 CFR Part 61, subpart H, *National Emission Standards for Emission of Radionuclides Other Than Radon From Department of Energy Facilities,* (as effective on October 9, 2002). The most stringent applicable emission standard is set forth in 40 CFR §61.92 which provides that emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem per year.

5. An emission unit's potential-to-emit radionuclides to the air must be calculated in accordance with WAC 246-247-030(21) and 40 CFR §61.93(f). The calculation must be based on discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal. Pursuant to WAC 246-247-075 and 40 CFR §61.93, all radionuclides which could contribute greater than 10% of the potential effective dose equivalent for a release point shall be measured. Continuous radionuclide emission measurements are required, under WAC 246-247-075 and 40 CFR §61.93, at all emission units that have a potential to discharge radionuclides into the air in quantities that could cause an effective dose equivalent to the MEI in excess of 1% of the standard. For release points which have a lower potential to release radionuclides into the air, periodic confirmatory measurements are required to verify the low emissions. 40 CFR §61.93(e).

6. In May of 2005, DOH began an audit of the 296-S-21 emission unit in accordance with WAC 246-247-080(1). The PTE for the 296-S-21 emission unit had been calculated using the results of a Non-Destructive Analysis (NDA) of the pollution control equipment. The use of NDA for PTE determination is described in WAC 246-247-030 (21)(c), which states:

"Potential-to-emit" means the rate of release of radionuclides from an emission unit based on the actual or potential discharge of the effluent stream that would result if all abatement control equipment did not exist, but operations are otherwise normal. Determine the potential-to-emit by one of the following methods:

(c) Measure the quantities of radionuclides captured in each control device, coupled with in-situ measurements of the control equipment efficiencies, as approved by the."

7. Departmental approval was not requested or granted in this instance. The current Notice of Construction Approval issued by DOH for the 296-S-21 emission unit, dated December 12, 2002, was based on an application submitted by the Department of Energy in which the Department of Energy calculated the PTE using the Annual Possession Quantity under WAC 246-247-030(21)(a). Among other things, the approval specifically requires that the facility be able to demonstrate a quality assurance program compatible with applicable national standards and be able to demonstrate the reliability and accuracy of emission data and other test results from the 296-S-21 emission unit pursuant to WAC 246-247-075(6) and (13).

8. The NDA calculation for the 296-S-21 emission unit did not meet the calculation requirements of WAC 246-247-030(21) (c). As discussed below, the miscalculation resulted in the emission unit being identified as having a PTE that would not cause an effective dose equivalent in excess of 1% of the standard. When the PTE is properly determined, the PTE exceeds the 1% threshold for continuous monitoring. Therefore, the 296-S-21 emission unit requires continuous monitoring in accordance with WAC 246-247-075(1) and 40 CFR §61.93(e). The 296-S-21 emission unit is not being continuously monitored.

9. The 296-S-21 emission unit is the single exhaust point for the 222-S Laboratory hoods and hotcells. The 222-S Laboratory conducts chemical analyses of samples from the single-shell and double-shell tanks located at the Hanford Site. The single-shell and double-shell tanks contain approximately 200,000,000 curies of nuclear waste, effluent from chemical separation processes designed to extract fissile Plutonium, and Uranium isotopes from nuclear fuel irradiated in Hanford's nine defense production reactors. All radioactive fission and activation products of the irradiated nuclear fuel are contained in approximately 53,000,000 gallons of tank waste.

10. During the audit, DOH requested relevant records, pursuant to WAC 246-247-080(10), and obtained a copy of the current PTE assessment for the emission unit, completed in July of 2001, and published in HNF-1974, Rev. 1, "*Radionuclide National Emission Standard for Hazardous Air Pollutants Potential-to-Emit Assessment,*" dated September 2002. DOH

also obtained a copy of an electronic mail transmission from Larry P. Diediker to Ronald J. Boom, dated July 13, 2001, titled "NDA of S-21 Stack HEPAs (july12).XLS."

11. According to the documents received from the Department of Energy, the PTE assessment was based on a Non-Destructive Analysis of 10 of the 96 final stage HEPA filters. The average curie content per filter was determined. This value was then multiplied by the 96 total final stage filters to come up with a total curie amount which would be released out of the stack had the filters not been in place. The resulting dose to the maximally exposed individual (MEI) was 1.61E-06 mrem/year offsite and 2.4E-06 mrem/year onsite. Based on the assessment, HNF-1974, Rev. 1, concluded that the 296-S-21 emission unit did not exceed 1% of the standard (0.1 mrem/year) effective dose equivalent to the MEI and, therefore, did not trigger the need for continuous monitoring as required under 40 CFR §61.93.

12. During review of the PTE assessment, DOH determined that the 296-S-21 emission unit has multiple stages of HEPA filtration upstream of the final stage HEPA filters. The total number of filters in series range from a pre-filter and two HEPA filters to a pre-filter and four HEPA filters. The curie content on the final stage of HEPA filtration was used in the calculation of PTE without correction for the upstream HEPA filters and prefilters, contrary to WAC 246-247-030(21)(c) and 40 CFR §61.93.

13. As noted above, the calculation did not factor in measured *in situ* filter efficiencies as required under WAC 246-247-030(21)(c). If the appropriate measured filter efficiencies are used with the NDA results, as required, the resulting PTE exceeds the 1% threshold for continuous monitoring. For purposes of completing the audit, the Department has back-calculated the 296-S-21 PTE from reported stack emissions and measured *in situ* filter efficiencies using the method of WAC 246-247-030(21)(b). The resulting PTE exceeds the 1% threshold for continuous monitoring.

14. The Department has also estimated the 296-S-21 PTE using the method of WAC 246-247-030(21)(a) and various annual possession quantities submitted by the licensee. The results exceed the 1% threshold for continuous monitoring.

15. Because the PTE exceeds the 1% threshold for continuous monitoring, the Department finds that the 296-S-21 stack is a "major" emission unit, and is subject to the continuous monitoring requirements of WAC 246-247-075 and 40 CFR §61.93. Failure to comply with WAC 246-247-030(21)(c) and 40 CFR 61.93 led to a significant underestimate of the PTE for 296-S-21, sufficient to cause the stack to be wrongly designated as a "minor" stack. Such a failure indicates an inadequate quality control program under WAC 246-247-075(6).

16. As described above, the PTE calculations used for the 296-S-21 emission unit were in error. The total numbers of filters in the treatment train were not used in the final calculation. Although there are up to four filters in series and a pre-filter, the calculation accounted for none of those upstream of the final filter. WAC 246-247-030(21) requires that the calculation assume that all of the pollution control equipment did not exist. The NDA method of calculation, under WAC 246-247-030(21)(c), also requires the use of measured filter efficiencies. Like the NDA method of PTE calculation, the separate calculation method of back-calculation of PTE from effluent emission measurements, set forth in WAC 246-247-030(21)(b) also requires measurement of the total number of filters in the treatment train and the use of measured filter efficiencies. Given that the regulatory methods of calculating PTE share common elements, the error seen at 296-S-21 could easily have occurred at other actively ventilated emission units, particularly those at which the PTE was calculated using the NDA or back-calculation method.

17. In pursuing its responsibility to ensure compliance with WAC 246-247, DOH must generally rely on the accuracy of the licensee's PTE calculation. The occurrence of the PTE error for 296-S-21 casts doubt on the adequacy of the licensee's processes and organizational safeguards in this regard. Doubt therefore shadows all PTE determinations reported for Hanford actively ventilated minor emission units, particularly those at which the PTE was calculated using the NDA or back-calculation method.

II. ORDER

The following actions are necessary for compliance with the requirements of WAC 246-247 and 40 CFR Part 61, subpart H:

1. Immediately begin continuous sampling of the 296-S-21 emission unit as required under WAC 246-247-075(1)(2) and 40 CFR 61.93 using the existing sampling system. The sample shall be changed out once every two weeks, and a gross alpha and gross beta analysis shall be performed. The samples shall be held and composited on a quarterly basis and specific isotopic analysis shall be performed for all radionuclides which could contribute greater than 10% of the PTE to the MEI, greater than 01 mrem to the MEI, or 25% of the dose to the MEI after controls in accordance with WAC 246-247-060(1) and WAC 246-247-110(9).

2. Within 60 days of receipt of this Notice of Violation and Compliance Order, perform an assessment of the 296-S-21 monitoring system to determine what actions are necessary to bring the monitoring system into compliance with requirements of WAC 246-247-075. Within the same time frame, provide a schedule, for review and approval by DOH, for completing any necessary upgrades.

3. Within six months of receipt of this Notice of Violation and Compliance Order, re-evaluate your quality assurance program in accordance with WAC 246-247-075(6) to make certain that adequate processes and organizational safeguards are in place to ensure the accuracy of PTE determinations, and submit a copy of the document to DOH for review and approval. Within six months of the department's approval of the quality assurance program, re-evaluate the PTE for each Hanford actively ventilated minor emission unit at which the PTE was calculated using the NDA or back-calculation method and/or at each Hanford actively ventilated minor emission unit at which the PTE was calculated according to any of the methods in WAC 246-247-030(21)(b, c, d, e) without DOH approval. The re-evaluations shall be based on an approved quality assurance program. Ensure that appropriate methods are properly applied, in accordance with WAC 246-247-030(21) to determine an emission unit's potential-to-emit.

III. SUPPLEMENTAL AND MODIFICATION

DOH may supplement or modify the foregoing order if changes are warranted to ensure compliance with chapter 246-247 WAC or to allow for your practical ability to correct the violations.

IV. PLACE TO SUBMIT DOCUMENTS

All documents required to be submitted to DOH shall be sent to Allen W. Conklin, Office of Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827.

V. TECHNICAL ASSISTANCE

If you have questions or require technical assistance to comply with the foregoing order, please contact Allen Conklin at (360) 236-3261 or John Martell at (509) 946-3798.

VI. OPPORTUNITY TO MEET WITH THE DEPARTMENT

In accordance with RCW 70.94.332, you may request a meeting with DOH before enforcement action is taken. If you wish to request such a meeting, you must do so within the time period specified for compliance.

VII. NOTICE REGARDING ENFORCEMENT

If you fail to comply with any provision of the foregoing order, the Department of Health may impose upon you civil penalties calculated on a per day basis of up to ten thousand ($10,000) dollars per violation per day. Each violation is a separate and distinct offense, and in the case of a continuing violation, each day's continuance is a separate and distinct violation. If civil penalties are imposed, you will have the right to an adjudicative proceeding in accordance with RCW 43.70.095.

VIII. NOTICE REGARDING LICENSE MODIFICATION

In order to formally recognize the change in the PTE at the 296-S-21 emission unit and to effectuate necessary changes to the monitoring system, the Department will modify the unit's Notice of Construction approval when appropriate. You will have a right to an adjudicative proceeding regarding the license modification in accordance with RCW 43.70.115.

DATED this 17th day of November, 2005.

ALLEN W. CONKLIN, Supervising Health Physicist
Air Emissions and Defense Waste Section

cc: Dennis Bowser, DOE-ORP
Mary Jarvis, DOE-RL
Nick Ceto, EPA
Davis Zhen, EPA
Earl Fordham, DOH
Gary Robertson, DOH
Lilia Lopez, AGO
Ron Skinnerland, Ecology

Fax: Mary Jarvis, DOE-RL
Dennis Bowser, DOE-ORP
Jeff Luke, CH2M

cc w/encl:
Administrative Record
(files: 222-S Laboratory Notice of
Violation; Emission Unit 296-S-21)
B. P. Atencio, PNNL
J. M. Barnett, PNNL
J. A. Bates, FHI
D. J. Carrell, CH2M
B. L. Curn, BNI
L. P. Diediker, FHI
D. L. Dyekman, FHI
R. H. Engelmann, FHI
L. Fritz, FHI
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J. G. Woolard, WCH